**EXHIBIT A**

**STATEMENT OF WORK**

Under this contract between the Northwest Power and Conservation Council (Council) and Gwen Shearer (Contractor), the Contractor will complete the tasks identified below, which primarily include enhancements to be made to the Council’s GENESYS computer model. The tasks are listed in order of priority and can be modified or deleted with mutual consent from Council staff and the Contractor. The Contractor will also provide the deliverables listed at the end of this document no later than August 31, 2013.

**Tasks:**

1. **Add More Nodes for the NW Region**:
Currently the GENESYS model breaks the NW region into two nodes, east and west, and accounts for the transmission capacity between these two nodes. This configuration, however, ignores transmission limitations for other sub-regional areas that may limit access to market supplies. This has prompted concerns that adequacy assessments using the current configuration may be too optimistic. By adding additional nodes for the NW and accounting for those transmission limitations, a more realistic regional assessment can be made. Council staff will work with others to determine the most appropriate configuration for the NW. It will be a priority to make that configuration consistent with those found in other regional models such as AURORAxmp and the Council’s Regional Portfolio Model. Once that determination is made, the Contractor will incorporate the specified additional nodes into GENESYS along with the transmission capacity limitations. If time permits, the Contractor will aid Council staff in amending resource and load data to fit the new configuration.
2. **Thermal Project Availability**:
Work with BPA and Council staff to identify and implement the abilty to turn on and turn off thermal plants on a submonthly basis.
3. **Adjust Hourly Hydro Dispatch to Account for Weekly Energy Shapes**:
The GENESYS model currently uses dispatched monthly hydro energy to assess the hydro system’s peaking capability (via the peak vs. energy curves). This method could underestimate or overestimate peaking capability, depending on how much weekly hydro energy differs from the monthly average. Moving to an explicit weekly hydro dispatch is not a viable option, however, developing weekly energy shape factors and using those factors to better assess weekly peaking capability would provide a more accurate assessment. The Contractor will work with BPA and Council staff to review historical streamflow and hydro generation data to develop a set of weekly shape factors. The Contractor will then modify the GENESYS model to use the adjusted weekly energy values to determine the hydro peaking capability.
4. **Treaty Storage Regulation**:
Work with BPA staff to identify exogenous calculations that could be incorporated directly into the GENESYS model. These calculations are generally performed in spreadsheets and could be automated by transforming them into constraints and including them in the operating exceptions file.  Once identified, the contractor will automate said spreadsheets in the GENESYS model.  Work with BPA staff to confirm and to change GENESYS, if necessary, to maintain the right project constraint order.
5. **Redefine GENESYS operating periods from 12 to 14**:
Currently the GENESYS model simulates the operation of the NW power supply on a monthly basis before dropping into an hourly dispatch. This approach is not consistent with regional hydro regulation models that break up the year into 14 periods (with April and August being split). Yet, GENESYS uses the 14-period input from these regulation models and then aggregates the results for April and August. By breaking up the operating year in GENESYS into 14 periods, it makes GENESYS consistent with other hydro models and eliminates convoluted logic to aggregate hydro data. The Contractor will modify GENESYS to dispatch on a 14-period per year basis.
6. **Provide Beta Testing for the BPA Developed User Interface**:
BPA expects to have a beta version of a graphic user interface for the GENESYS model ready by early in 2013. The Contractor will aid BPA and Council staff in debugging and testing the beta interface. The Contractor may also provide suggestions in terms of ease of use or efficiency but will not be asked to aid in the actual development of the interface.
7. **Documentation**:
Provide documentation for all enhancements made to the GENESYS model.

**Deliverables**: (due by August 31, 2013)

* The source code and associated data files for the revised and tested GENESYS model (not including the user interface), which includes all of the enhancements identified in the tasks above.
* A report documenting all modifications made to GENESYS subroutines and modules.

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